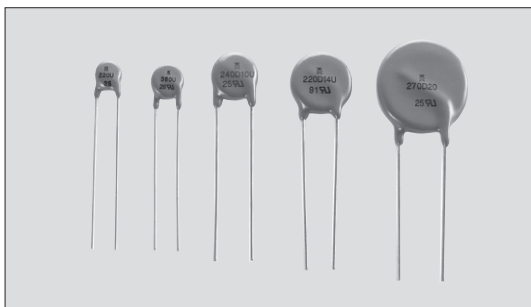


# VARISTORS



## NV 金属氧化物压敏电阻器 Metal Oxide Varistors



外观颜色: 绿色 Body color: Green 表示: 文字表示 Marking: Alphanumeric

### ■ 特点 Features

- 有双向对称性, 可吸收正负浪涌。
- 包装上采用阻燃性环氧树脂 (UL94V-0)。
- 本目录所载产品 (82V以上), 已取得了UL1449。
- 本目录所载产品 (200V以上), 已取得了UL1414。
- 耐电涌量提高到过去产品的约2倍 (公司内比较), 最大电能提高到过去产品的约1.5倍 (公司内比较)。
- 内部连接焊接无铅品, 对应欧盟RoHS。
- Varistors own two-way symmetries and can absorb positive and negative surges.
- Flame retardant epoxy resin (UL94V-0) is employed for the outer coating.
- Products (82V or more) described in this catalog are recognized by UL1449.
- Products (200V or more) described in this catalog are recognized by UL1414.
- The max. peak current has developed about 2 times and the max. energy about 1.5 times in comparison with the existing products.
- Products with lead free inner connect solder meet EU-RoHS requirements.

### ■ 用途 Applications

- 直流和交流线路设备的防感应闪电冲击对策。
- 吸收来自电动机、继电器等感应载荷的过电压, 和从过电压保护半导体元件。
- Measures for inductive lightning surges of those equipment that are connected to d.c. and a.c. lines.
- Absorption of surge voltages from inductive load of motors, relays, etc. and protection of semiconductor elements from excessive voltages.

### ■ 取得标准 Approval Awarded and Coverage

- UL1449 (3rd Edition) (File No. E328032)  
NVD05, NVD07: 82~470V, NVD10: 82~1100V, NVD14: 82~910V, NVD20: 200~910V
- UL1414, c-UL1414 (File No. E123865)  
NVD05, NVD07: 200~470V, NVD10: 200~1100V, NVD14, NVD20: 200~910V
- VDE (CECC42000, CECC42200, CECC42201, IEC61051: File No. 40015637)  
NVD05, NVD07: 22~470V, NVD10: 22~1100V, NVD14: 22~910V

### ■ 额定值 Ratings

工作温度范围 Operating Temperature Range:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$  保存温度范围 Storage Temperature Range:  $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$

| 型 号<br>Type   | 压敏电阻器<br>电压<br>Varistor<br>Vol.<br>(V) | 最大允许<br>回路电压<br>Max. Allowable<br>Circuit Vol. |         | NVD05UC                         |                                                |                                  | NVD07UC                         |                                                |                                     | NVD10UC•NVD10U BC※3             |                                                |                                   | NVD14UC※4                       |                                                |                                    | NVD20UC                         |                                                |                               |
|---------------|----------------------------------------|------------------------------------------------|---------|---------------------------------|------------------------------------------------|----------------------------------|---------------------------------|------------------------------------------------|-------------------------------------|---------------------------------|------------------------------------------------|-----------------------------------|---------------------------------|------------------------------------------------|------------------------------------|---------------------------------|------------------------------------------------|-------------------------------|
|               |                                        | a.c.r.m.s(V)                                   |         | 最大电能<br>Max.<br>Energy<br>E (J) | 耐浪涌量<br>Max. Peak<br>Current<br>Ip(A)(2 times) | 限制电压<br>Clamping Vol.<br>V1A V5A | 最大电能<br>Max.<br>Energy<br>E (J) | 耐浪涌量<br>Max. Peak<br>Current<br>Ip(A)(2 times) | 限制电压<br>Clamping Vol.<br>V2.5A V10A | 最大电能<br>Max.<br>Energy<br>E (J) | 耐浪涌量<br>Max. Peak<br>Current<br>Ip(A)(2 times) | 限制电压<br>Clamping Vol.<br>V5A V25A | 最大电能<br>Max.<br>Energy<br>E (J) | 耐浪涌量<br>Max. Peak<br>Current<br>Ip(A)(2 times) | 限制电压<br>Clamping Vol.<br>V10A V50A | 最大电能<br>Max.<br>Energy<br>E (J) | 耐浪涌量<br>Max. Peak<br>Current<br>Ip(A)(2 times) | 限制电压<br>Clamping Vol.<br>V00A |
|               |                                        |                                                | d.c.(V) |                                 |                                                |                                  |                                 |                                                |                                     |                                 |                                                |                                   |                                 |                                                |                                    |                                 |                                                |                               |
| NVD05UCD018   | 16~22                                  | 11                                             | 14      | 0.3                             | 50                                             | 40 —                             | —                               | —                                              | —                                   | —                               | —                                              | —                                 | —                               | —                                              | —                                  | —                               | —                                              | —                             |
| NVD05UCD022   | 20~27                                  | 14                                             | 18      | 0.5                             | —                                              | 48 — 1.1                         | —                               | —                                              | 2.6                                 | —                               | —                                              | 43 — 5.3                          | —                               | 43 —                                           | —                                  | —                               | —                                              | —                             |
| NVD05UCD027   | 25~32                                  | 17                                             | 22      | 0.7                             | —                                              | 60 — 1.3                         | —                               | —                                              | 53 — 3.2                            | —                               | —                                              | 53 — 6.5                          | —                               | 53 —                                           | —                                  | —                               | —                                              | —                             |
| NVD05UCD033   | 30~39                                  | 20                                             | 26      | 0.8                             | —                                              | 73 — 1.6                         | —                               | —                                              | 65 — 4.0                            | —                               | —                                              | 65 — 7.9                          | —                               | 65 —                                           | —                                  | —                               | —                                              | —                             |
| NVD05UCD039   | 37~47                                  | 25                                             | 31      | 0.9                             | 125                                            | 86 — 1.9                         | 250                             | 77 — 4.4                                       | —                                   | 500                             | 77 — 9.4                                       | —                                 | 1000                            | 77 —                                           | —                                  | —                               | —                                              | —                             |
| NVD05UCD047   | 45~54                                  | 30                                             | 38      | 1.1                             | —                                              | 104 — 2.3                        | —                               | —                                              | 93 — 5.7                            | —                               | —                                              | 93 — 11.0                         | —                               | 93 —                                           | —                                  | —                               | —                                              | —                             |
| NVD05UCD056   | 52~62                                  | 35                                             | 45      | 1.3                             | —                                              | 123 — 2.7                        | —                               | —                                              | 110 — 6.7                           | —                               | —                                              | 110 — 13.0                        | —                               | 110 —                                          | —                                  | —                               | —                                              | —                             |
| NVD05UCD068   | 60~76                                  | 40                                             | 56      | 1.6                             | —                                              | 150 — 3.3                        | —                               | —                                              | 135 — 8.2                           | —                               | —                                              | 135 — 16.0                        | —                               | 135 —                                          | —                                  | —                               | —                                              | —                             |
| NVD05UCD082   | 74~90                                  | 50                                             | 65      | 1.7                             | 200                                            | — 145 3.5                        | 600                             | — 135 8.0                                      | 1250                                | — 135 14.0                      | —                                              | — 135 14.0                        | 2500                            | — 135 —                                        | —                                  | —                               | —                                              | —                             |
| NVD05UCD100※4 | 90~110                                 | 60                                             | 85      | 3.0                             | —                                              | — 175 6.0                        | —                               | — 165 12.0                                     | —                                   | — 165 18.0※                     | —                                              | — 165 18.0※                       | —                               | — 165 —                                        | —                                  | —                               | —                                              | —                             |
| NVD05UCD120   | 108~132                                | 75                                             | 100     | 3.5                             | —                                              | — 210 7.0                        | —                               | — 200 14.5                                     | —                                   | — 200 30.0                      | —                                              | — 200 30.0                        | —                               | — 200 —                                        | —                                  | —                               | —                                              | —                             |
| NVD05UCD150   | 135~165                                | 95                                             | 125     | 4.5                             | —                                              | — 260 9.0                        | —                               | — 250 18.0                                     | —                                   | — 250 37.5                      | —                                              | — 250 37.5                        | —                               | — 250 —                                        | —                                  | —                               | —                                              | —                             |
| NVD05UCD200   | 185~225                                | 130                                            | 170     | 6.0                             | —                                              | — 355 12.5                       | —                               | — 340 25.0                                     | —                                   | — 340 50.0                      | —                                              | — 340 50.0                        | 5000                            | — 340 100                                      | —                                  | —                               | 340                                            | —                             |
| NVD05UCD220   | 198~242                                | 140                                            | 180     | 6.5                             | —                                              | — 380 13.5                       | —                               | — 360 27.5                                     | —                                   | — 360 55.0                      | —                                              | — 360 55.0                        | —                               | — 360 110                                      | —                                  | —                               | 360                                            | —                             |
| NVD05UCD240   | 216~264                                | 150                                            | 200     | 7.5                             | —                                              | — 415 15.0                       | —                               | — 395 30.0                                     | —                                   | — 395 60.0                      | —                                              | — 395 60.0                        | —                               | — 395 120                                      | —                                  | —                               | 395                                            | —                             |
| NVD05UCD270   | 247~303                                | 175                                            | 225     | 8.0                             | —                                              | — 475 17.0                       | 1250                            | — 455 35.0                                     | —                                   | — 455 70.0                      | —                                              | — 455 70.0                        | —                               | — 455 135                                      | —                                  | —                               | 455                                            | —                             |
| NVD05UCD330   | 297~363                                | 210                                            | 270     | 9.5                             | —                                              | — 570 20.0                       | —                               | — 545 42.0                                     | —                                   | — 545 80.0                      | —                                              | — 545 80.0                        | —                               | — 545 —                                        | —                                  | —                               | —                                              | —                             |
| NVD05UCD360   | 342~396                                | 230                                            | 300     | 11.0                            | —                                              | — 620 23.0                       | —                               | — 595 45.0                                     | —                                   | — 595 90.0                      | —                                              | — 595 90.0                        | —                               | — 595 180                                      | —                                  | —                               | 595                                            | —                             |
| NVD05UCD390   | 367~429                                | 250                                            | 320     | 12.0                            | —                                              | — 675 25.0                       | —                               | — 650 50.0                                     | —                                   | — 650 100.0                     | —                                              | — 650 100.0                       | —                               | — 650 195                                      | —                                  | —                               | 650                                            | —                             |
| NVD05UCD430   | 407~473                                | 275                                            | 350     | 13.5                            | —                                              | — 745 27.5                       | —                               | — 710 55.0                                     | —                                   | — 710 110.0                     | —                                              | — 710 110.0                       | —                               | — 710 215                                      | —                                  | —                               | 710                                            | —                             |
| NVD05UCD470   | 437~517                                | 300                                            | 385     | 15.0                            | —                                              | — 810 30.0                       | —                               | — 775 60.0                                     | —                                   | — 775 125.0                     | —                                              | — 775 125.0                       | —                               | — 775 250                                      | —                                  | —                               | 775                                            | —                             |
| NVD05UCD510   | 474~561                                | 320                                            | 410     | —                               | —                                              | —                                | —                               | —                                              | —                                   | — 845 —                         | —                                              | — 845 —                           | —                               | — 845 —                                        | —                                  | —                               | —                                              | —                             |
| NVD05UCD620   | 577~682                                | 385                                            | 505     | —                               | —                                              | —                                | —                               | —                                              | —                                   | — 1025 136.0                    | —                                              | — 1025 136.0                      | 4500                            | — 1025 273                                     | —                                  | —                               | 1025                                           | —                             |
| NVD05UCD680   | 637~748                                | 420                                            | 560     | —                               | —                                              | —                                | —                               | —                                              | —                                   | — 1120 —                        | —                                              | — 1120 —                          | —                               | — 1120 —                                       | —                                  | —                               | 1120                                           | —                             |
| NVD05UCD750   | 697~825                                | 460                                            | 615     | —                               | —                                              | —                                | —                               | —                                              | —                                   | — 1240 150.0                    | —                                              | — 1240 150.0                      | —                               | — 1240 300                                     | —                                  | —                               | 1240                                           | —                             |
| NVD05UCD780   | 737~858                                | 485                                            | 640     | —                               | —                                              | —                                | —                               | —                                              | —                                   | — 1290 —                        | —                                              | — 1290 —                          | —                               | — 1290 —                                       | —                                  | —                               | 1290                                           | —                             |
| NVD05UCD820   | 767~902                                | 510                                            | 670     | —                               | —                                              | —                                | —                               | —                                              | —                                   | — 1355 165.0                    | —                                              | — 1355 165.0                      | —                               | — 1355 325                                     | —                                  | —                               | 1355                                           | —                             |
| NVD05UCD910   | 857~1000                               | 550                                            | 745     | —                               | —                                              | —                                | —                               | —                                              | —                                   | — 1500 180.0                    | —                                              | — 1500 180.0                      | —                               | — 1500 360                                     | —                                  | —                               | 1500                                           | —                             |
| NVD05UCD1100  | 1070~1210                              | 680                                            | 895     | —                               | —                                              | —                                | —                               | —                                              | —                                   | — 1815 —                        | —                                              | — 1815 —                          | —                               | —                                              | —                                  | —                               | —                                              | —                             |
| NVD05UCD1800  | 1700~1980                              | 1000                                           | 1465    | —                               | —                                              | —                                | —                               | —                                              | —                                   | — 2970 360.0                    | —                                              | — 2970 360.0                      | —                               | — 2970 —                                       | —                                  | —                               | —                                              | —                             |

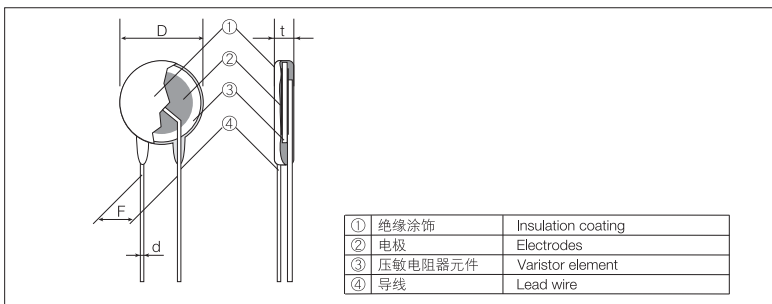
□中填入磁盘直径 Disk dia. enters □.

※3 NVD10UCB的制作范围为压敏电阻器电压22~270V。 Manufacturing range of NVD10UCB is varistor voltages 22~270V.

※4 适用NVD14C100 NVD14SCD100 is applied.

上述以外的详细数据也已准备, 请向营业所索要。 Detailed data other than the above-mentioned are also available, for which please ask our sales office.

### ■ 结构图 Construction



### ■ 外形尺寸 Dimensions

| 型号<br>Type | 尺寸 Dimensions (mm) |             |       |          | Weight (g)<br>(1000pcs) |
|------------|--------------------|-------------|-------|----------|-------------------------|
|            | D max.※1           | d (Nominal) | F     | t max.※1 |                         |
| NVD05U     | 7~7.5              | 0.6         | 5±1   | 4.3~5.90 | 50~80                   |
| NVD07U     | 9~9.5              | 0.6         | 5±1   | 4.3~5.90 | 90~140                  |
| NVD10UB    | 12                 | 0.6         | 5±1   | 4.3~5.30 | 180~220                 |
| NVD10U     | 12~13.5            | 0.8         | 7.5±1 | 4.3~14.4 | 180~500                 |
| NVD14U     | 16~17              | 0.8         | 7.5±1 | 4.3~14.4 | 270~760                 |
| NVD20U     | 23~24              | 1.0         | 10±1  | 5.8~10.8 | 580~1210                |

※1 D最大和t最大, 因压敏电阻器电压不同而变化。

※1 D max. and t max. vary according to the varistor voltage.

### ■ 品名构成 Type Designation

| NV                    | D05                                                              | U                                                                                        | C                                      | D                                          | MT                                                | A                                           | 022                                      |
|-----------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------|---------------------------------------------------|---------------------------------------------|------------------------------------------|
| 品种<br>Product<br>Code | 磁盘直径<br>Diameter of<br>Element                                   | 系列※2<br>Series                                                                           | 端子表面材质<br>Terminal<br>Surface Material | 端子表面材质<br>Inner Connect<br>Solder Material | 二次加工<br>Taping &<br>Forming                       | 包装<br>Packaging                             | 压敏电阻器电压<br>Varistor<br>Voltage           |
|                       | D05: φ5mm<br>D07: φ7mm<br>D10: φ10mm<br>D14: φ14mm<br>D20: φ20mm | S-S系列<br>S series<br>U-U系列<br>U-U series<br>UB-U系列<br>U series<br>(5mm节距)<br>(5mm pitch) | C: SnCu                                | D: SnAgCu<br>(Nil: Sn/Pb)                  | 空栏: 散装<br>Nil: Bulk<br>P: 263引脚<br>Refer to P.263 | 空栏: 散裝<br>Nil: Bulk<br>A: AMMO包装<br>A: AMMO | EX,<br>22V~022<br>470V~470<br>1800V~1800 |

※2 UB只限适应NVD 10系列。

※2 UB is applied for NVD 10 series only.

预知关于此产品含有的环境负荷物质详情 (除EU-RoHS以外), 请与我们联系。

Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS.

本样本手册中记载的产品规格如有变更, 恕不一一奉告。订购以及使用之前, 请仔细确认规格表的内容。

用于车载设备、医疗设备、航空设备以及其他涉及人身安全、或可能引起重大损失的设备上时, 请务必事先与我公司联系。这些产品在这类用途中出现故障或失灵可能导致人身事故或严重损坏。

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

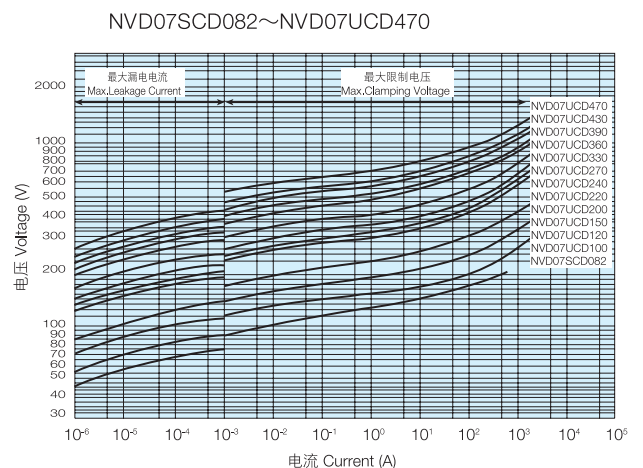
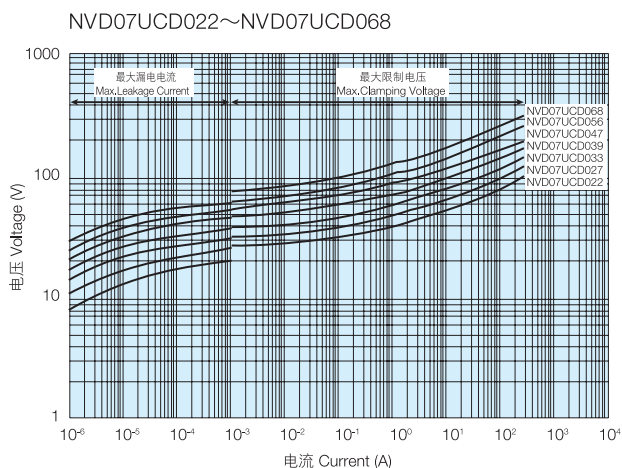
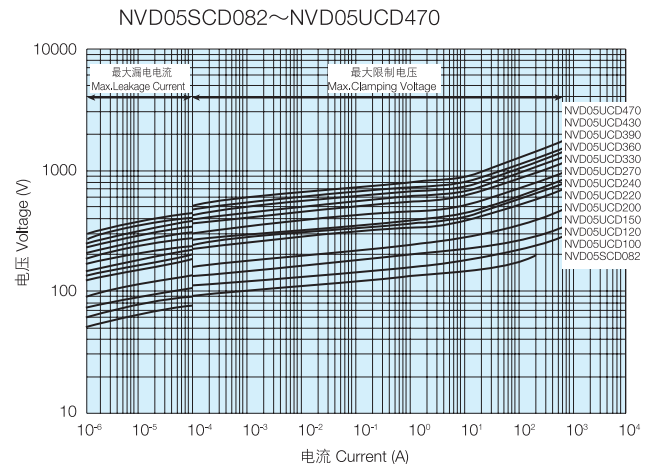
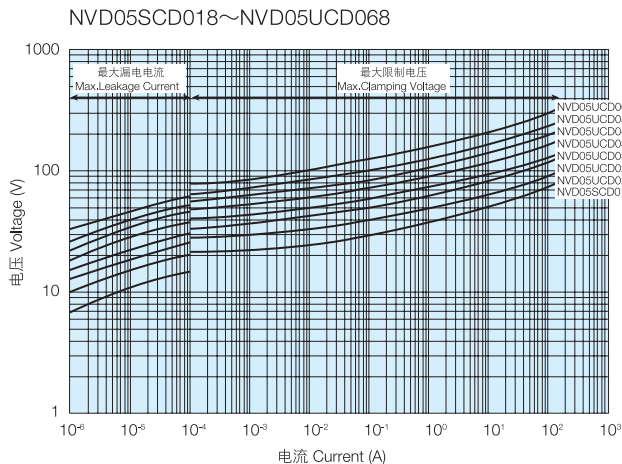
Contact our sales representatives before you use our products for applications including automobiles, medical equipment and aerospace equipment.

Malfunction or failure of the products in such applications may cause loss of human life or serious damage.

## 性能 Performance

| 试验项目<br>Test Items                                      | 标准值 Performance Requirements<br>ΔV±%          | 试验方法<br>Test Methods                                                                                                                                                                                                                   |    |      |       |          |     |                   |
|---------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|-------|----------|-----|-------------------|
| 压敏电阻器电压<br>Varistor Voltage                             | 在规定的允许偏差以内。<br>Within specified tolerance     | 把规定的电流Ic流入压敏电阻器时的端子间电压。<br>The voltage between terminals when the specified current is flowed. <table><tr><td>Ic</td><td>Type</td></tr><tr><td>0.1mA</td><td>NVD05UCD</td></tr><tr><td>1mA</td><td>NVD07UCD~NVD20UCD</td></tr></table> | Ic | Type | 0.1mA | NVD05UCD | 1mA | NVD07UCD~NVD20UCD |
| Ic                                                      | Type                                          |                                                                                                                                                                                                                                        |    |      |       |          |     |                   |
| 0.1mA                                                   | NVD05UCD                                      |                                                                                                                                                                                                                                        |    |      |       |          |     |                   |
| 1mA                                                     | NVD07UCD~NVD20UCD                             |                                                                                                                                                                                                                                        |    |      |       |          |     |                   |
| 耐焊接热<br>Resistance to soldering heat                    | ±5%，外观应无异常。<br>No abnormality in appearance.  | 260±5℃，10s±1s                                                                                                                                                                                                                          |    |      |       |          |     |                   |
| 焊接性<br>Solderability                                    | 端子电极95%以上被新的焊接覆盖。<br>95% coverage min.        | 230℃±5℃，5s±0.5s/250℃±5℃，5s±0.5s(Pb free)                                                                                                                                                                                               |    |      |       |          |     |                   |
| 温度突变<br>Rapid change of temperature                     | ±5%，外观应无异常。<br>No abnormality in appearance.  | －40℃(30min.)/+125℃(30min.) 5cycles: 下述以外 Except NVD20UCD<br>－40℃(30min.)/+85℃(30min.) 5cycles: NVD20UCD                                                                                                                                |    |      |       |          |     |                   |
| 耐浪涌量<br>Maximum peak current                            | ±10%，外观应无异常。<br>No abnormality in appearance. | 额定的冲击波电流（T=8/20μS），正反施加各一次。<br>Rated impulse current of (T=8/20μs), positive/negative applied once each.                                                                                                                               |    |      |       |          |     |                   |
| 施加高温直流电压<br>High temperature life with d.c. bias        | ±10%，外观应无异常。<br>No abnormality in appearance. | 85℃±5℃，Vc=最大允许电压（V d.c.）1000小时<br>Load: Maximum Allowable Voltage（d.c.）                                                                                                                                                                |    |      |       |          |     |                   |
| 施加高温交流电压<br>High temperature life with d.c. bias        | ±10%，外观应无异常。<br>No abnormality in appearance. | 85℃±5℃，Vc=最大允许电压（Va.c.r.m.s.）1000小时<br>Load: Maximum Allowable Circuit Voltage（Va.c.r.m.s.）                                                                                                                                            |    |      |       |          |     |                   |
| 高温高湿储存<br>High temperature & high humidity storage life | ±5%，外观应无异常。<br>No abnormality in appearance.  | 80℃±5℃，95%RH, 1000h                                                                                                                                                                                                                    |    |      |       |          |     |                   |
| 高温保存<br>High temperature storage life                   | ±5%，外观应无异常。<br>No abnormality in appearance.  | 125℃±5℃，1000h                                                                                                                                                                                                                          |    |      |       |          |     |                   |
| 低温保存<br>Low temperature storage life                    | ±5%，外观应无异常。<br>No abnormality in appearance.  | －40℃±5℃，1000h                                                                                                                                                                                                                          |    |      |       |          |     |                   |

## 电压—电流曲线 Voltage-Current Curves (Reference) ( $T_a=25^\circ\text{C}$ )



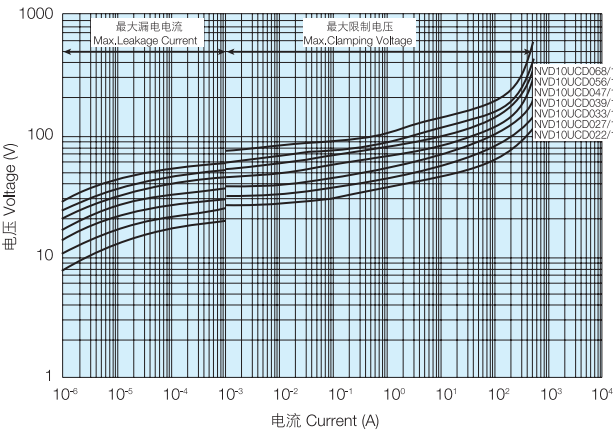
## 使用上注意 Precautions for Use

- 施加了超过最大电能的脉冲电力时, 压敏电阻器有破坏的危险, 因此, 应在既定值以内使用。
- Use it within the specified values as there is a risk of destruction of the varistor when the impulse power over the maximum energy is applied.

# VARISTORS

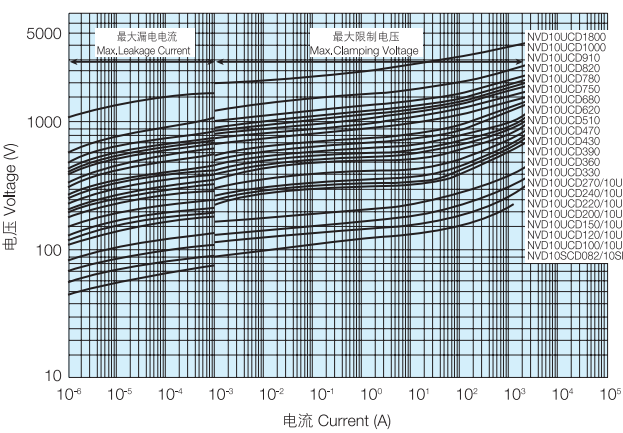
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NVD10UBCD022~NVD10UBCD068

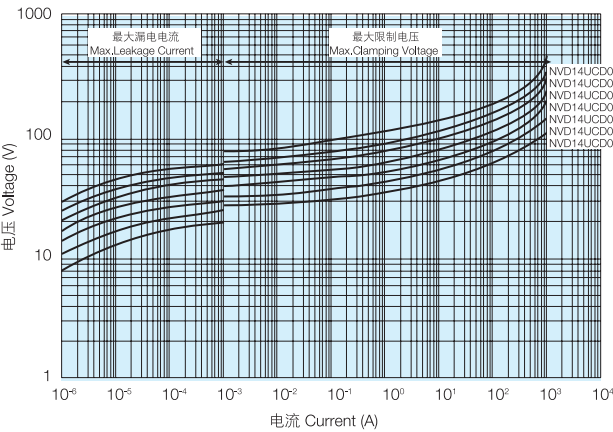


NVD10SCD082~NVD10UCD1800

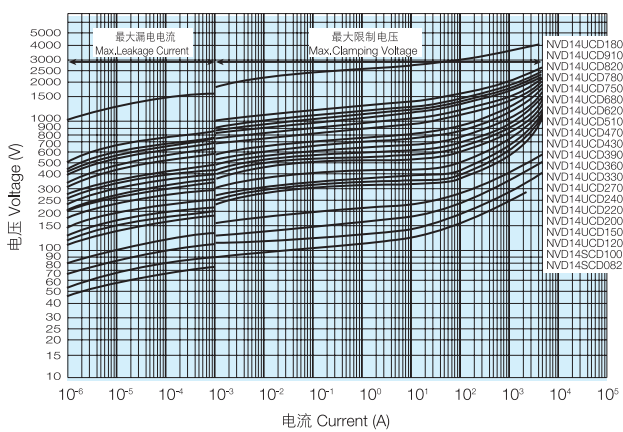
NVD10SBCD082~NVD10UBCD270



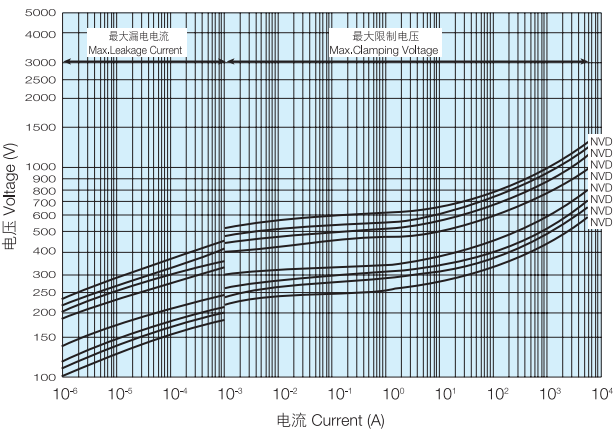
NVD14UCD022~NVD14UCD068



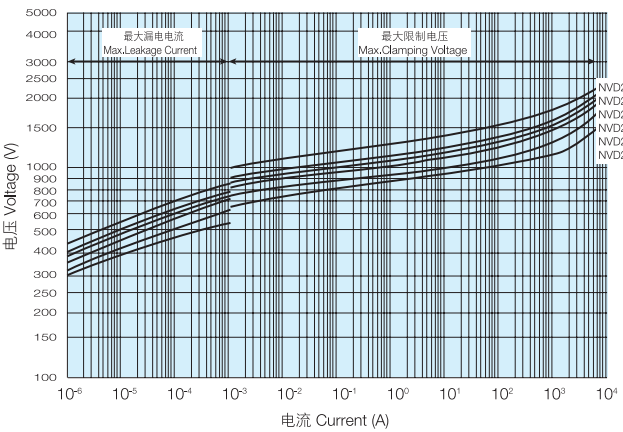
NVD14SCD082~NVD14UCD1800



NVD20UCD200~NVD20UCD470

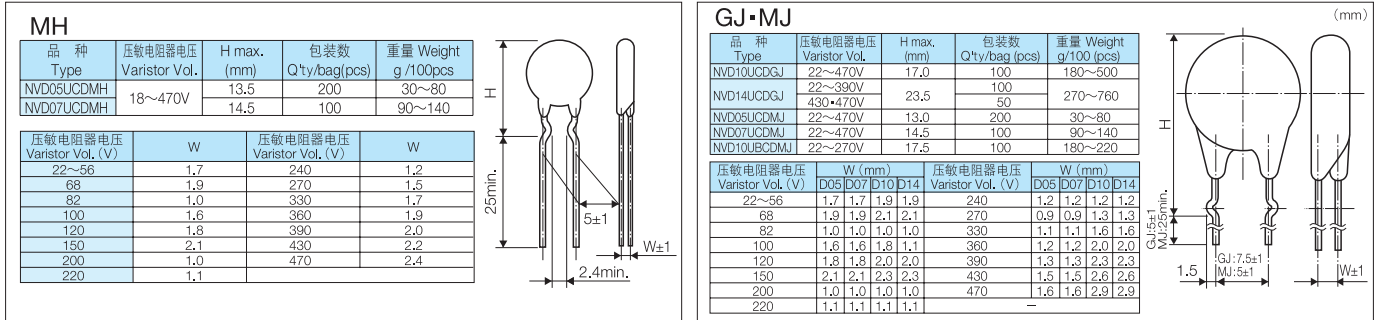


NVD20UCD620~NVD20UCD910

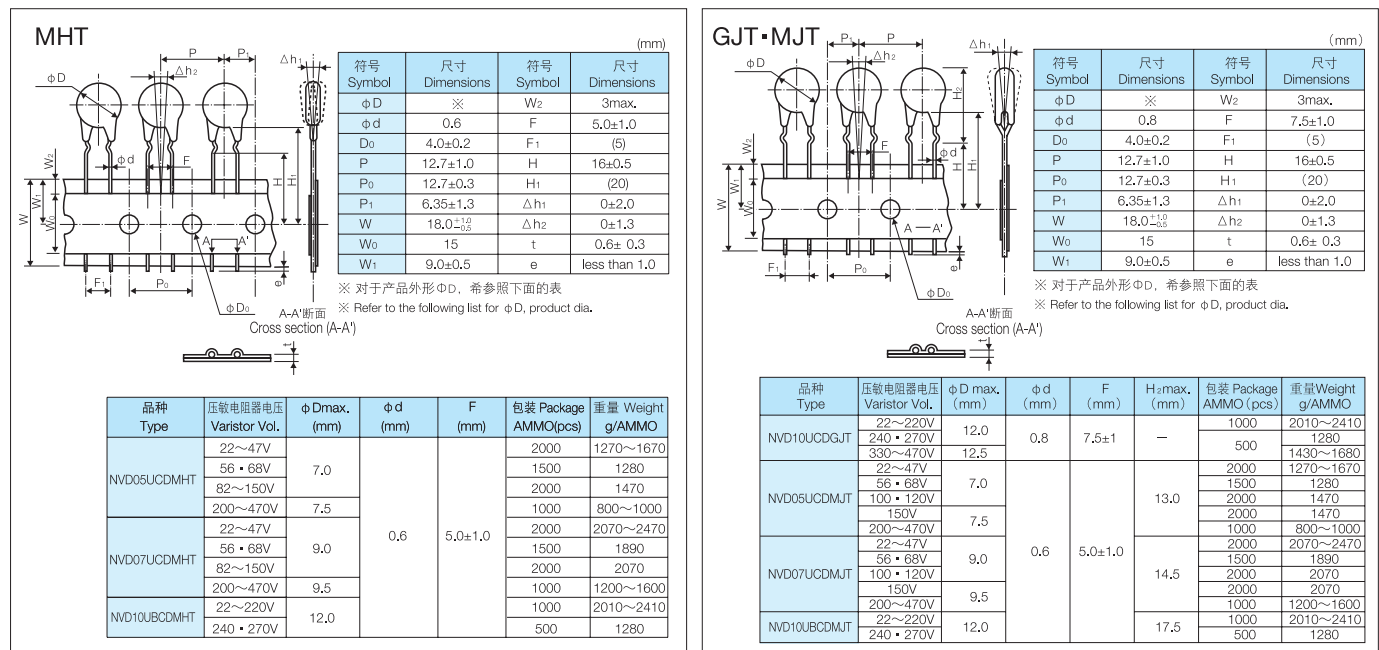
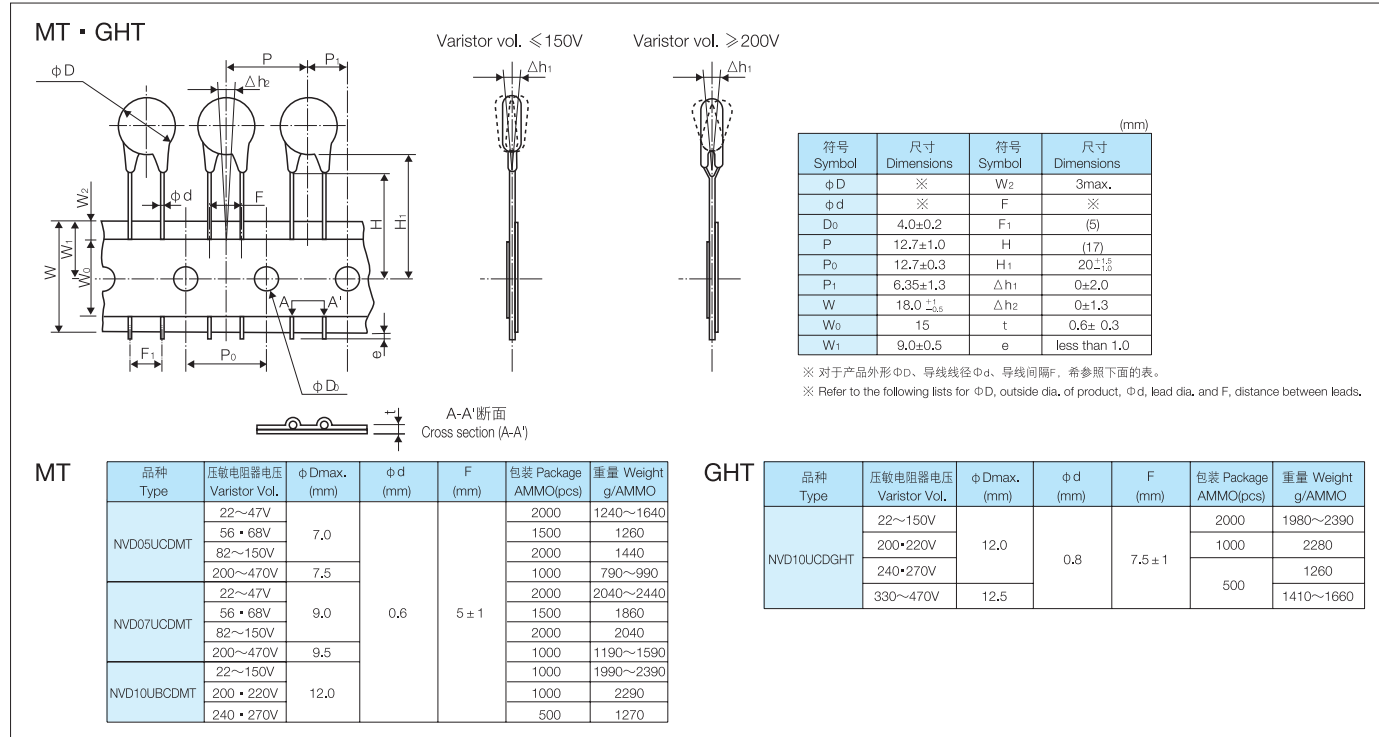


本样本手册中记载的产品规格如有变更，恕不一一奉告。订购以及使用之前，请仔细确认规格表的内容。  
用于车载设备、医疗设备、航空设备以及其它涉及人身安全、或可能引起重大损失的设备上时，请务必事先与我公司联系。这些产品在这类用途中出现故障或失灵可能导致人身事故或严重损坏。  
Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.  
Contact our sales representatives before you use our products for applications including automobiles, medical equipment and aerospace equipment.  
Malfunction or failure of the products in such applications may cause loss of human life or serious damage.

## ■ 成形（不对应编带） Forming (Taping Not Available)



## ■ 径向编带 Radial Taping



※ 压敏电阻器电压82V品（整体形状）的成形和编带和NVD14型的100V品的成形，S系列对应。

※ Forming and taping varistors of 82V (all shapes) and forming NVD14 type of 100V will be supplied with our standard type products.